IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS AND INTERFERENCES

Appellants	:	ROREGER et al.
Serial No.	:	10/534,797 (U.S. Patent Application Publication 2006-0016905)
Filing Date	:	12 May 2005
For	:	DISPENSER FOR THE CONTROLLED RELEASE OF VOLATILE SUBSTANCES
Examiner	:	HWU, Davis D
Art Unit	:	3752

745 Fifth Avenue
New York, New York 10151

APPEAL BRIEF UNDER 37 C.F.R. 41.37

Mail Stop: Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an Appeal Brief filed in response to the Final Rejection of claims 1, 4-14 and 18-24 in the Office Action dated 20 October 2009.

The Commissioner is authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-0320.

(I) REAL PARTY IN INTEREST

The real party in interest in this appeal is the assignee, LTS Lohmann Therapie-Systeme AG, who is the owner of this application by assignment from the inventors (Reel 017108/Frame 0314).

(II) RELATED APPEALS AND INTERFERENCES

Appellants are not aware of any related appeals or interferences which directly affect or are directly affected by or have bearing on the Board's decision in the pending appeal.

(III) STATUS OF CLAIMS

By the final rejection dated 20 October 2009, claims 1, 4-14 and 18-24 have been finally rejected.

(IV) STATUS OF AMENDMENTS

The appellants amendment after final rejection filed on 18 December 2009 has been entered and it is believed that all other amendments by the appellants have been entered into the record.

(V) SUMMARY OF CLAIMED SUBJECT MATTER

The only independent claim under appeal is claim 1 which is reproduced below with support in the specification indicated in [ ].

1. A dispenser for controlled release of volatile substances, comprising [page 2, lines 1-2]

a reservoir that is flat and has a top face and a bottom face, and which is covered on its top face with a layer of material impermeable to the volatile substances and covered on its bottom face by a first control element, said reservoir containing at least one volatile substance, [page 3, lines 23-24 and 36-39]

said first control element is composed of a material which is permeable to the at least one volatile substance, and [page 9, lines 26-27]

which exerts control over the release rate of said at least one volatile substance by means of diffusion dependent on the physical properties of the at least one volatile substance and

the material properties of said permeable material of the first control element, and [page 2, lines 13-29 and page 10, lines 37-39]

a second control element composed of a material which is impermeable to the at least one volatile substance, and [page 11, lines 20-22]

which exerts control over the release rate of said at least one volatile substance by controlling the size of the surface of the first control element independent of the physical properties of the at least one volatile substance and the material properties of said permeable material of the first control element [page 2, line 31 thru page 3, line 1]

wherein the second control element is in the form of a film that possesses gaps wherein the number of said gaps is from 500 to 8000 gaps per m^2 of said film; [page 12, line 16 thru page 13, line 5]

and wherein said first control element is pressure-sensitively adhesive and [page 10, lines 9-10]

fully covered by said second control element [page 13, lines 25-29]

such that during the use of the dispenser, the at least one volatile substance moves from the reservoir first through the first control element and then through the second control element [page 2, lines 8-11]

wherein the first control element and the second control element jointly control release of the at least one volatile substance from the reservoir [page 3, lines 3-6].

(VI) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The only rejection of record is the rejection of claims 1, 4-14 and 18-24 as allegedly being obvious over Paul (U.S. Patent 5,556,030).

(VII) ARGUMENTS

A. Standards for determining obviousness

As reiterated by the Supreme Court in *KSR International Co. v. Teleflex Inc. (KSR)*, 550 U.S. 398, 82 USPQ2d 1385 (2007), the framework for the objective analysis for determining obviousness under 35 U.S.C. 103 is stated in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). Obviousness is a question of law based on underlying factual inquiries. The factual inquiries enunciated by the Court are as follows:

(A) Determining the scope and contents of the prior art;
(B) Ascertaining the differences between the prior art and the claims in issue;
(C) Resolving the level of ordinary skill in the art; and
(D) Evaluating evidence of secondary considerations.

When ascertaining the differences between the prior art and the claims in issue, both the claimed invention and the prior art are considered as a whole.

Once the *Graham* factual inquiries are resolved, Office personnel must determine whether the claimed invention would have been obvious to one of ordinary skill in the art.

In the final rejection of 20 October 2009, the Examiner relies on a "design incentives" rationale for articulating the basis of obviousness. For the a design incentives rationale, Office personnel have been instructed that they must articulate the following:

(1) a finding that the scope and content of the prior art, whether in the same field of endeavor as that of the applicant's invention or a different field of endeavor, included a similar or analogous device (method, or product);

(2) a finding that there were design incentives or market forces which would have prompted adaptation of the known device (method, or product);

(3) a finding that the differences between the claimed invention and the prior art were encompassed in known variations or in a principle known in the prior art;

(4) a finding that one of ordinary skill in the art, in view of the identified design incentives or other market forces, could have implemented the claimed variation of the prior art, and the claimed variation would have been predictable to one of ordinary skill in the art; and

(5) whatever additional findings based on the *Graham* factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

The rationale to support a conclusion that the claimed invention would have been obvious is that design incentives or other market forces could have prompted one of ordinary skill in the art to vary the prior art in a predictable manner to result in the claimed invention. If any of these findings cannot be made, then this rationale cannot be used to support a conclusion that the claim would have been obvious to one of ordinary skill in the art. *See MPEP 2143, section F.*

B. Claims 1, 4-14 and 22-24 are unobvious over Paul

1. The *Graham* factual inquiries were resolved incorrectly because the determination of the scope and contents of the prior art was made in error

The rejection of claims 1, 4-14 and 22-24 rely on some interpretations of Paul which are factually incorrect. As such, the "design choice" rationale for establishing obviousness made in the final rejection of 20 October 2009 was based on a faulty inquiry of the *Graham* factors.

a. The dispenser of Paul does not serve to control the release of the volatile substance with two control elements

Part of the confusion may stem from the different views of the Paul dispenser. Figure 7 shows element 58 (a fragrance bearing member which comprises a solid construction or a gel securely retained between permeable membrane layers 50 and 55 – see col. 13, lines 32-34). The permeable membrane layers can be interpreted as correlating to the first control element of the appellants' invention (additional difference explained in section 2. below).

However, side wall or panels 22 and 23 in Paul are not control elements, but rather packaging for the dispenser. The packing is torn open to expose the permeable membrane layers 50 and 55 to the atmosphere, i.e. the volatile substance passes through only one layer, not two.

The holes 33-36 and the elongated sealing strip 38 are part of the embodiment of Figure 2 which differs from Figure 7. Element 30 is the fragrance bearing member (akin to element 58) wherein the fragrance diffuses into the a holding zone or pouch 24. The holes 33-36 are over this holding zone and not the permeable membrane layer 50 or 55, i.e. the structure of Figure 2 also does not have two control elements working in concert as in the appellants' claimed dispenser.

b. The statement in the Office Action that the Paul dispenser comprises a reservoir "wherein in first control element is a pressure-sensitively adhesive" (Page 2, second and third lines from bottom) is not found in Paul

The "first control element 50" is a permeable membrane layer. See col. 11, lines 23-31 of Paul:

> "By constructing permeable membrane 50 in the manner consistent with the molecular structure of the air freshening/deodorizing composition being employed, the rate of dispersion of the air freshening/deodorizing composition into the ambient air is precisely controlled automatically. Furthermore, the use of permeable membrane 50 assures a continuous, dependable and completely repeatable rate of dispersion of the air freshening/deodorizing composition into the ambient surroundings."

See also col. 13, lines 47-59

> "Furthermore, permeable membrane layers 50 and 55 may be formed from any suitable material capable of providing a layer compatible with side walls or panels 22 and 23, ***as well as incorporating a pore size consistent with the molecular structure of the fragrance to be dispersed therethrough***. Preferably, permeable membrane layers 50 and 55 are formed from polymeric plastic films or sheets which are impermeable to liquids but allow vapors to pass therethrough. Generally, any suitable polymeric film or sheet can be employed, such as sheets or films formed from polyurethane, polyethers, polyesters, polypropylenes, polystyrene, and combinations thereof." (emphasis added)

There is no disclosure in Paul that these control elements 50 or 55 are a pressure-sensitive adhesive.

In addition to the fact that Paul does not have two control elements, it also follows that Paul's first control element is not adhesively attached to the second control element as in the appellants' claimed invention as Paul's first control element is not comprised of a pressure-sensitive adhesive.

c. The term "adhesive" was given a broad and unreasonable interpretation which would be unrecognizable to one of ordinary skill in the art when read in light of the appellants specification

The Federal Circuit's *en banc* decision in *Phillips v. AWH Corp.*, 415 F.3d 1303, 75 USPQ2d 1321 (Fed. Cir. 2005) expressly recognized that the USPTO employs the "broadest reasonable interpretation" standard:

> The Patent and Trademark Office ("PTO") determines the scope of claims in patent applications not solely on the basis of the claim language, but upon giving

> claims their broadest reasonable construction ***"in light of the specification as it would be interpreted by one of ordinary skill in the art."*** *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364[, 70 USPQ2d 1827] (Fed. Cir. 2004). Indeed, the rules of the PTO require that application claims must "conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description." 37 CFR 1.75(d)(1).

415 F.3d at 1316, 75 USPQ2d at 1329.

The statement in paragraph 11 of the Advisory Action mailed on 8 January 2010 stated that "…an adhesive is any substance that will attach to a surface, element 55 attaches to a surface thus making it a pressure sensitive adhesive" is also factually incorrect.

However, a dictionary definition for an adhesive is that it is "[a]ny substance, inorganic or organic, natural or synthetic, that is capable of ***bonding other substances*** by surface attachment." (see Hawley's Condensed Chemical Dictionary (15th Edition), ed. Richard J. Lewis, page 25, (2007). Paul does not describe this function for element 55 nor is it an inherent function as there is no bonding of other substances much less a teaching that the bonding is pressure sensitive by Paul.

In addition, this interpretation ascribed to the term "adhesive" is inconsistent with the description given by the appellants in their specification (see e.g. page 10, lines 9-17 of the appellants' specification – "In one particular embodiment the first control element (6) is pressure-sensitively adhesive, something which is preferably achieved by using a polymer having pressure-sensitive adhesive properties (i.e., a pressure-sensitive adhesive) or by adding tackifiers to a polymer or polymer blend which is not inherently tacky. Tackifiers are known to the skilled worker. They include tackifying resins such as Abitol, esters of (hydro-)abietic acid, etc.").

The Examiner's strained interpretation of the term "adhesive" is precisely the type of overly broad interpretation which was admonished by the Federal Circuit in the recent *Suitco* decision ("The PTO's construction here, though certainly broad, is unreasonably broad. The broadest-construction rubric coupled with the term "comprising" does not give the PTO an unfettered license to interpret claims to embrace anything remotely related to the claimed invention. Rather, claims should always be read in light of the specification and teachings in the

underlying patent. *See Schreiber-Schroth Co. v. Cleveland Trust Co.*, 311 U.S. 211, 217 (1940)." *In re Suitco* (Fed. Cir. – April 14, 2010))

Therefore, one of ordinary skill in the art giving the appellants' claims its broadest reasonable interpretation consistent with the specification would not read the scope of the claim as encompassing element 55 as described by Paul.

d. Conclusion

Given these erroneous interpretations regarding the Paul reference in relation to the appellants' claimed dispenser, there are at least three differences which have not been accounted for by Paul or the level of knowledge accorded to those of skill in the art even before addressing the differences explained below as being attributable to design incentives.

Therefore, for these reasons alone, the Examiner has not established that the appellants' claimed dispenser is obvious over Paul.

2. The design incentives rationale for the number of gaps has not been adequately articulated to establish that claims 1, 4-14 and 22-24 are obvious

The appellants acknowledge that the first prong of the design incentives rationale is met, i.e. the appellants' dispenser and Paul's dispenser are generally in the same field of endeavor.

However, there has been no finding that there were design incentives or market forces which would have prompted the adaptation of Paul's device.

As described in the final rejection, "the volatile substance [in Paul] moves from the reservoir first through the first control element and then through the second control element after removal of the flap 51." (see page 2, last line – page 3, line 2 of Paul). Even when giving the Examiner the benefit of the doubt that Paul intended flap 51 to be considered a "second control element", one of ordinary skill in the art would view the invention of Paul to be a rather crude means of controlling the flow of a volatile substance.

An element of the appellants' claim is that the first control element exerts control over the release rate of the volatile substance by means of diffusion ***dependent*** on the physical properties of the volatile substance and that the second control element exerts control ***independent*** of the physical properties of the volatile substance. Paul's dispenser lacks any such distinction.

Moreover, if the rationale for obviousness is one based on modification of Paul in view of design incentives or market forces, one of ordinary skill in the art would not have sought to increase the cost or complexity of use of the Paul dispenser by using a system which requires dual control systems which operate jointly.

Likewise, one of ordinary skill in the art would not have further modified the second control element to have a number of gaps of from 500 to 8000 gaps per m^2. In the context of Paul's invention, if the flap 51 is being deemed to be equivalent to a 'second control element", it would be non-sensical to have gaps in the flap as Paul's device would be leaking the volatile substance from the instant the dispenser was manufactured.

As such, the number of gaps in the second control element (as well as simply having a first and second control element operating jointly) is not simply a matter of design choice as asserted in the Office Action, but is essential for determination of the degree of coverage of the first control element and thereby controlling the predetermined release rate of the volatile substance.

Therefore, even if Paul had taught all of the elements addressed in section B.1. above, Paul does not direct one of skill in the art to modify their dispenser to have dual control systems which operate jointly or to have gaps in the second control element.

C. Claims 18-21 are unobvious over Paul

As claims 18-21 are ultimately dependent upon claim 1, the arguments presented above against the holding of obviousness of claim 1 over Paul are also applicable to claims 18-21 and for this reason alone, the rejection of claims 18-21 over Paul should be withdrawn.

Claim 18 includes the additional requirement that the second control element is an open-pore foam or a is a web material and claim 19 further limits claim 18 by requiring that the second control element is an open-pore foam. Again, Paul use of such elements in the context of their invention would be leaking the volatile substance from the instant the dispenser was manufactured even without gaps; having gaps would simply accelerate the loss of the volatile substance. It is not surprising that Paul fails to teach these elements because Paul also fails to teach the dual control systems which operate jointly or that that the first control element exerts control over the release rate of the volatile substance by means of diffusion ***dependent*** on the physical properties of the volatile substance and that the second control element exerts control

independent of the physical properties of the volatile substance which would allow use of the elements of claims 18 or 19.

Therefore, claims 18 and 19 are also unobvious for these reasons alone.

(VIII) CLAIMS APPENDIX

Claim 1 (Previously presented)

1. A dispenser for controlled release of volatile substances, comprising

a reservoir that is flat and has a top face and a bottom face, and which is covered on its top face with a layer of material impermeable to the volatile substances and covered on its bottom face by a first control element, said reservoir containing at least one volatile substance,

said first control element is composed of a material which is permeable to the at least one volatile substance, and which exerts control over the release rate of said at least one volatile substance by means of diffusion dependent on the physical properties of the at least one volatile substance and the material properties of said permeable material of the first control element, and

a second control element composed of a material which is impermeable to the at least one volatile substance, and which exerts control over the release rate of said at least one volatile substance by controlling the size of the surface of the first control element independent of the physical properties of the at least one volatile substance and the material properties of said permeable material of the first control element

wherein the second control element is in the form of a film that possesses gaps wherein the number of said gaps is from 500 to 8000 gaps per m^2 of said film;

and wherein said first control element is pressure-sensitively adhesive and fully covered by said second control element such that during the use of the dispenser, the at least one volatile substance moves from the reservoir first through the first control element and then through the second control element

wherein the first control element and the second control element jointly control release of the at least one volatile substance from the reservoir.

Claims 2 and 3 (Cancelled)

Claim 4 (Previously presented)

4. The dispenser of claim 1, characterized in that reservoir is a cavity which contains the at least one volatile substance.

Claim 5 (Previously presented)

5. The dispenser of claim 1, characterized in that the reservoir comprises a carrier material which is capable of accommodating a volatile substance in the form of a solution, a suspension, a dispersion, an adsorbate or an absorbate.

Claim 6 (Previously presented)

6. The dispenser of claim 1, characterized in that the reservoir has a thickness of 0.1 mm to 2.5 cm and a length and a width between 4 mm and 20 cm.

Claim 7 (Previously presented)

7. The dispenser of claim 5, characterized in that the carrier material comprises a natural or synthetic polymer.

Claim 8 (Previously presented)

8. The dispenser of claim 5, characterized in that the carrier material is in solid matrix, fiber, textile woven, nonwoven, knitted, foam, powder, gel, solution, granule or web form.

Claim 9 (Previously presented)

9. The dispenser of claim 1, characterized in that the first control element comprises further auxiliaries selected from the group consisting of plasticizers, tackifiers, pigments, thickeners, gel formers, film formers, antioxidants and dyes.

Claim 10 (Previously presented)

10. The dispenser of claim 1, characterized in that the material which is permeable to the at least one volatile substance comprises a natural or synthetic polymer selected from the group consisting of polysaccharides, cellulose, cellulose derivatives, cellulose esters, hemicelluloses, alginates, rayon, cellulose nitrates, acetate rayon, starch, gelatin,

carrageenan, gum arabic, chitin, pectin, cellulose, viscose staple, polyacrylates, polyacrylonitrile, polybutadiene, polybutene, polycarbonate, polychlorotrifluoroethylene, polydialkylsiloxane, polyisoprene, polyethers, polyethylene, polyethylene glycol, polyethylene glycol esters, polyethylene glycol ethers, polyglycol esters, polyisobutene, polypeptides, polypropylene, polystyrene, polytetrafluoroethylene, polyurethane, polyvinyl acetate, polyvinyl alcohol, polyvinyl chloride, polyvinyl esters, polyvinyl ethers, polyvinylidene chloride, polyvinylpyrrolidone, proteins, and styrene-isoprene-styrene block copolymers and blend thereof.

Claim 11 (Previously presented)

11. The dispenser of claim 1, characterized in that the second control element is in the form of a film and has a thickness of between 50 μm and 2.5 mm.

Claim 12 (Previously presented)

12. The dispenser of claim 1, characterized in that the gaps in the second control element are tubular, spherical or irregular.

Claim 13 (Previously presented)

13. The dispenser of claim 1, characterized in that the at least one volatile substance is an active chemical and/or biological substance selected from the group consisting of disinfectants, detersives, fragrances, crop protection agents, pharmaceuticals, pheromones, cleaning agents, repellents, attractants, and detergents.

Claim 14 (Previously presented)

14. The dispenser of claim 1, characterized in that the at least one volatile substance is a fragrance or fragrance mixture with attractive or repellent action on insects, fish, amphibians, reptiles, birds or mammals.

Claims 15-17 (cancelled)

Claim 18 (Previously presented)

18. The disperser of claim 1, wherein the second control element is an open-pore foam or is a web material.

Claim 19 (Previously presented)

19. The dispenser of claim 18, wherein the second control element is an open-pore foam.

Claim 20 (Previously presented)

20. The dispenser of claim 18, wherein the web material is fiber membrane having a basis weight of 100 g/m^2.

Claim 21 (Previously presented)

21. The dispenser of claim 18, wherein the web material is a fiber membrane consisting of 100% viscose or 70% viscose and 30% polyethylene terephthalate.

Claim 22 (Previously presented)

22. The dispenser of claim 14, characterized in that the at least one volatile substance is a pheromone selected from the group consisting of muscalure, disparlure, bombykol, brevicomin, (E,E)-8,10-dodecadien-1-ol, (Z)-9-dodecenyl acetate, (E)-9-dodecenyl acetate, 7,11-dimethyl-3-methylene-1,6,10-dodecatriene, Z-11-hexadecenal, Z-11-hexadecenyl acetate, (Z,Z)-11,13-hexadecadienal, cis-11-tetradecenyl acetate, trans-11-tetradecenyl acetate, Z-9-tricosene, Z,E-9,12-tetradecadien-1-yl acetate, (E,Z)-2,13-octadecadienal, (E)-2-octadecenal, E(10),(Z)12-hexadecadien-1-ol, and (E)-4-tridecen-1-yl acetate.

Claim 23 (Previously presented)

23. The dispenser of claim 1, wherein the first control element is between the reservoir and the second control element is uncovered.

Claim 24 (Previously presented)

24. The dispenser of claim 22, wherein the first control element is in at least partial contact with the layer of material impermeable to the volatile substances.

(IX) EVIDENCE APPENDIX

Exhibit A - Hawley's Condensed Chemical Dictionary (15th Edition), ed. Richard J. Lewis, page 25, (2007)

(X) RELATED PROCEEDINGS APPENDIX

None

CONCLUSION

In view of the foregoing, it is respectfully submitted that the claims on appeal are patentable and that the rejection over Paul under 35 U.S.C. §103(a) should be reversed.

Respectfully submitted,

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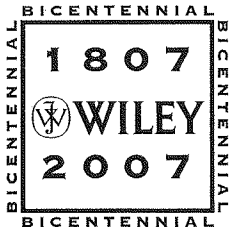
EXHIBIT A

Hawley's
Condensed Chemical Dictionary

Fifteenth Edition

Richard J. Lewis, Sr.



WILEY-INTERSCIENCE
A JOHN WILEY & SONS, INC., PUBLICATION

EXHIBIT A

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Published simultaneously in Canada.

Library of Congress Cataloging-in-Publication Data is available.

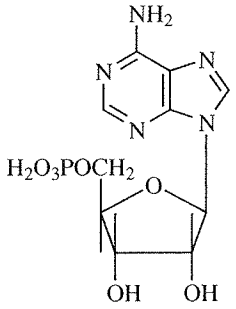
Lewis, Richard J., Sr.
Hawley's Condensed Chemical Dictionary, Fifteenth Edition
ISBN 13: 978-0-471-76865-4
ISBN 10: 0-471-76865-0

Printed in the United States of America.

10 9 8 7 6 5 4 3 2 1

Derivation: Extracted from nucleic acids of yeast; also made synthetically.
Use: Biochemical research.

5′-adenylic acid. (adenosine monophosphate; AA; adenosine phosphate; AMP; adenosine-phosphoric acid; cAMP).
CAS: 61-19-8. $C_{10}H_{14}N_5O_7P$. The monophosphoric ester of adenosine, i.e., the nucleotide containing adenine, *d*-ribose, and phosphoric acid. Adenylic acid is a constituent of many important coenzymes. Cyclic adenosine-3′,5′-monophosphate is designated by biochemists as cAMP.



Properties: (Muscle adenylic acid) crystalline solid. Mp 196–200C. Readily soluble in boiling water. Gives only traces of furfural when boiled with 20% hydrochloric acid.
Derivation: Extracted from muscle tissue; phosphorylation of adenosine.
Use: Biochemical research.

adhesion. The state in which two surfaces are held together by interfacial forces, which may consist of valence forces or interlocking action, or both. (ASTM)

adhesion tension. The decrease in free surface energy that occurs when a unit liquid-solid interface is substituted for a unit air-solid interface. It is equal to the product of the surface tension of the liquid and the cosine of the liquid-solid angle of contact.

adhesive. Any substance, inorganic or organic, natural or synthetic, that is capable of bonding other substances together by surface attachment. A brief classification by type is as follows:

I. Inorganic
  1. Soluble silicates (water glass)
  2. Phosphate cements
  3. Portland cement (calcium oxide–silica)
  4. Other hydraulic cements (mortar, gypsum)
  5. Ceramic (silica–boric acid)
  6. Thermosetting powdered glasses ("Pyroceram")

II. Organic
  1. Natural:
    (a) Animal: hide and bone glue, fish glue, blood and casein glues
    (b) Vegetable: soybean starch cellulosics, rubber latex, and rubber-solvent (pressure-sensitive); gums, terpene resins (rosin), mucilages
    (c) Mineral asphalt, pitches, hydrocarbon resins
  2. Synthetic
    (a) Elastomer-solvent cements
    (b) Polysulfide sealants
    (c) Thermoplastic resins (for hot-melts): polyethylene, isobutylene, polyamides, polyvinyl acetate
    (d) Thermosetting resins: epoxy, phenoformaldehyde, polyvinyl butyral, cyanoacrylates
    (e) Silicone polymers and cements

For further information, refer to Case Western Reserve University in Cleveland, Ohio, which maintains a fundamental research center for adhesives and coatings.

adhesive, high-temperature. (1) An organic polymer, e.g., polybenzimidazoles, that retains bonding strength up to 260C for a relatively long time (500–1000 hours); strength drops rapidly above 260C, 80% being lost after 10 minutes at 535C. (2) An inorganic (ceramic), e.g., silica–boric acid mixtures or cermets produce bonds having high strength above 2000F. Adhesive lap-bond strengths can be over 2000 psi at 1000F. These adhesives are used largely for aerospace service, and for metal-metal and glass-metal seals. A silicone cement is reported to have been used to adhere tiles to spacecraft.
See RTV.

adhesive, hot-melt. A solid, thermoplastic material that melts quickly upon heating, and then sets to a firm bond on cooling. Most other types of adhesives set by evaporation of solvent. Hot-melt types offer the possibility of almost instantaneous bonding, making them well suited to automated operation. In general, they are low-cost, low-strength products, but are entirely adequate for bonding cellulosic materials. Ingredients of hot-melts are polyethylene, polyvinyl acetate, polyamides, hydrocarbon resins, as well as natural asphalts, bitumens, resinous materials, and waxes.
Use: Rapid and efficient bonding of low-strength materials, e.g., bookbinding, food cartons, side-seaming of cans, miscellaneous packaging applications.
See sealant.

adhesive, rubber-based. (cement, rubber). (1) A solution of natural or synthetic rubber in a suitable organic solvent, without sulfur or other cur-